

# *HEMEROPHILA* METALMARK MOTHS OF FLORIDA (LEPIDOPTERA: CHOREUTIDAE)

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**ABSTRACT.**— The two known Florida and North American species of the Neotropical genus *Hemerophila* are reviewed. New records of *Hemerophila dyari* Busck are reported for the first time in over 90 years since the original description.

**KEY WORDS:** Bahamas, Cuba, Moraceae, Neotropical, *Rhobonda*, *Tortyra*, West Indies, *Zodia*.

The genus *Hemerophila* is a group of 27 species from the Neotropical faunal region in the metalmark moth family, Choreutidae. Two species occur in extreme southern Florida, one of which is endemic to the United States and the other also occurring in the Bahamas. Few persons have seen or collected the Florida endemic species, *Hemerophila diva* (Riley), which is without question the most brilliantly colored moth in North America. Even the color photographs shown here do not fully display the range of iridescent colors visible on specimens of *H. diva* as seen at different angles of light.

Species of *Hemerophila* may all feed on leaves of various *Ficus* trees (Moraceae). The Florida endemic, *H. diva*, has been reared from *Ficus citrifolia*. The other species, *Hemerophila dyari* Busck, has been reared from a *Ficus* sp. (Busck, 1900), and has been collected beneath a strangler fig tree, *Ficus aurea*, on Sanibel Island, Lee Co., thus indicating its likely hostplant.

## HEMEROPHILA Hübner

*Hemerophila* Hübner, [1817]:pl. 213, fig. 1. (Type-species: *Phalaena Tortrix albertiana* Cramer, 1781 [by monotypy])

*Gauris* Hübner, 1821:[1]. (Type-species: *Phalaena Tortrix albertiana* Cramer, 1781 [by monotypy])

*Walsinghamia* Riley, 1889:157. (Type-species: *Walsinghamia diva* Riley, 1889 [by monotypy])

**Diagnosis.**— The quadrate forewings, and the narrow, crescent-shaped valvae of the male genitalia, are characteristic of *Hemerophila*.

**Description.**— Adults small to moderate (10-21mm wingspread). *Head:* frons smooth, with scale tufts at antennal base; vertex with scales loosely appressed; labial palpus upcurved, with 2nd segment 1.5x longer than apical or basal segments; antenna sometimes with dorsal scaling to produce thickened-appearing antenna, and with long ventral setae in males. *Thorax:* smooth-scaled, robust. *Forewing* (Fig. 2): quadrate, with pterostigma relatively short; costal margin convex; dorsal margin nearly



Fig. 1. *Hemerophila diva* (Riley): a) ♂, Long Pine Key, Everglades Natl. Park, FL, 30 Apr 1975, J. B. Heppner (FSCA); b) ♂, same locality, 26 Apr 1975 (FSCA).

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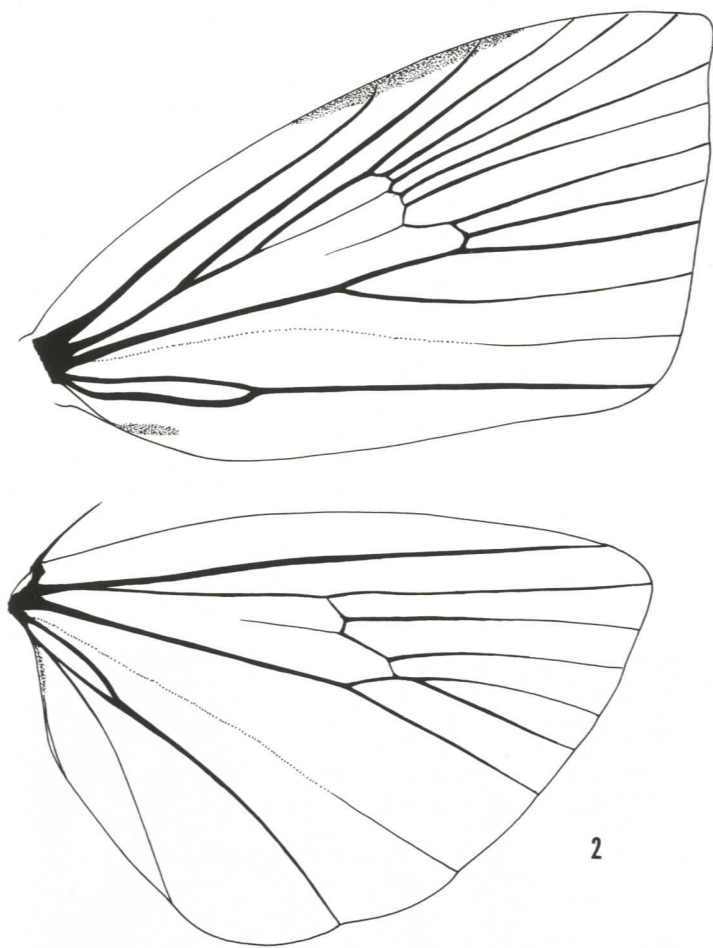


Fig. 2. Wing venation of *Hemerophila albertiana* (Cramer) ♂, French Guiana (USNM 77503).

straight; apex acute; termen truncate; tornus abruptly rounded; chorda developed; vestigial vein in cell; Sc to costal margin midwing;  $R_1$ - $R_4$  to costal margin;  $R_5$  to termen;  $M_1$  widely separated from  $M_2$  at base;  $M_2$ - $CuA_1$  equidistant at end of cell;  $CuA_1$  and  $CuA_2$  nearly parallel, with  $CuA_2$  distant from end of cell;  $CuP$  present at termen;  $A_{1+2}$  with moderate basal stalk;  $A_3$  minute. *Hindwing*: triangular, with convex costal margin, acute apex, and rounded termen and tornus; vestigial vein in cell;  $Sc+R_1$  to near apex;  $R_5$  to apex;  $M_1$  distant from  $M_2$  at base;  $M_3$  short-stalked with  $CuA_1$ ; cubital veins parallel; cubito-anal field large, with basal fold;  $A_3$  prominent;  $A_4$  minute at anal margin.

*Male genitalia*: uncus absent; gnathos absent; socius often very large; tegumen moderate; vinculum broadly rounded; valvae usually very elongate, with a tooth-like spine at apex, often with a basal setaceous clavus; valval setae sparse; anellus a flat plate of varying shape; rarely coremata hairs in pouches attached to valval bases, joined anteriorly to resemble a saccus; aedeagus with phallobase and broad juncture of ductus ejaculatorius; cornutus usually absent or reduced.

*Female genitalia*: ovipositor floricomous with large setaceous papilla analis pads; apophyses thin; ostium membranous, on intersegmental membrane between segments 7 and 8; sterigma often as large flat lateral plates; ductus seminalis arising below antrum, with bulla seminalis small; ductus bursae membranous, sometimes with some sclerotization on antrum, and usually with slight spiralling to bursae; corpus bursae round to ovate; signum a large spiculate plate or row of large spicules.

**Remarks.**— *Hemerophila* species are most nearly related to the Neotropical genus *Rhobonda*, the latter with two known species, plus one Oriental species which probably belongs with another

genus. There also is some relationship, as seen in the wing venation, to the Neotropical genus *Zodia*, with five known species.

### *Hemerophila diva* (Riley)

*Walsinghamia diva* Riley, 1889:158.

**Diagnosis.**— This species of subtropical Florida is the most colorful metalmark moth in North America and cannot be mistaken for any other species in the genus.

**Description.**— Forewing length: 5.7-8.8mm ♂ and ♀.

**Male** (Fig. 1).— *Head*: silver with orange postero-laterally; labial palpus tan-yellow with black on apical segment; antenna purple with an orange anterior line, and a white band near apex. *Thorax*: silvery fuscous; patagia silver; venter tan-yellow; legs tan-yellow, with fuscous and orange bands on tarsal segments. *Forewing*: violet-purple iridescent basal quarter with outer border tan-yellow or orange as a vertical fascia before midwing third of violet-purple to blue-green iridescent field; a yellow stria from near midwing, with a black border, going toward apex then sharply angled as a near subterminal band to tornus; apical quarter basad of apical yellow band as a green-golden iridescent field; terminal area a thin violet to blue-green line followed by a terminal distal orange band from apical quarter on costa around termen to tornus; fringe golden with fuscous base; venter orange, with fuscous over dorsal half of wing. *Hindwing*: orange with some fuscous along costal margin and basally on cubital and anal veins; fringe golden and fuscous; venter orange. *Abdomen*: orange with fuscous segmental bands; venter fuscous, with white tan near anterior end. *Male genitalia* (Fig. 4): generic characters, with socius very reduced as a thin band of several setae; valvae with large basal setal field; anellus plate quadrate with latero-basal arms; aedeagus (Fig. 4a) with tooth-like cornutus.

**Female.**— Same as for male. *Female genitalia* (Fig. 6): generic characters, with antrum having lateral sclerotizations; corpus bursae round and entirely spiculate; signum a rounded spined plate with anterior truncation.

**Types.**— *Lectotype* ♀: FLORIDA: [Coconut Grove, Miami, Dade Co.] (USNM 400). *Paralectotypes* (1♂, 1♀), same data (USNM). Lectotype and paralectotypes designated by Heppner (1982).

**Specimen data.**— FLORIDA.— *Collier Co.*: *Monroe Station*, 1 Sep 1963 (1♀), H. L. King (MCZ).

*Dade Co.*: *Biscayne Bay*, [no date] (1♀), A. T. Slosson (AMNH). Florida City, 15 Apr 1937 (1♀), M. S. Forsyth (CU); 19 Jun 1943 (1♂), (FSCA). *Miami*, [no date] (1♀), M. F. Grimshawe (FSCA); 16 Apr 1919 (1♂), G. F. Mozzette (USNM). *Key Biscayne*, 11 Apr 1989 (1♀), W. Birch & D. Storch (FSCA). *Long Pine Key*, Everglades Natl. Park, 26 Apr 1975 (2♂), 28 Apr 1975 (8♂), 30 Apr 1975 (6♂), J. B. Heppner (FSCA). *Royal Palm Park [Hammock]*, Everglades Natl. Park, 17 Jan 1930 (1♂), 18 Jan 1930 (2♂), F. M. Jones (ANSP); 18 Jan 1930 (1♀), 19 Jan 1930 (1♀), F. M. Jones (USNM); 17 Mar 1938 (1♂), E. P. Darlington (ANSP); Mar 1930 (1♀), Blatchley (USNM); 4-10 Dec 1938 (1♀), F. E. Watson & L. J. Sanford (AMNH).

*Monroe Co.*: *Key Largo* (14 mi NE), 17 Jun 1974 (1♂, 1♀ [reared ex *Ficus citrifolia*; adults 26-27 Jun 1974]), J. B. Heppner (FSCA); N. Key Largo, 20 Nov 1976 (2♂, 2♀), D. C. Ferguson (USNM). *Tavernier*, Key Largo, 27 Aug 1955 (1♀), 21 Sep 1955 (1♀), 17 Oct 1955 (1♂), J. N. Todd (MCZ). *Plantation Key*, 2 Mar 1945 (3♂, 4♀) [ex wild fig, Lot 45-5789], (USNM).

**Distribution.**— The species is known only from hardwood hammocks of southern Florida and the Florida Keys.

**Flight Periods.**— Probably near continuous generations, but records cover Jan, March-April, June, and September to December.

**Hosts.**— Thus far only *Ficus citrifolia* has been recorded as host. Larvae curl the leaves and skeletonize the surface. Pupation is on the leaf in a fluted webbing.

**Remarks.**— The maculation of *H. diva* is unique for the genus. The only species that even approaches it in regard to some of the wing fascia would be *Hemerophila albertiana* (Cramer) from Central and South America. The adults can be locally common when found on the host, *Ficus citrifolia*, in the tropical hardwood hammocks of southernmost Florida. This species has the thickened antennae, similar to those of *Tortyra*.

### *Hemerophila dyari* Busck

*Hemerophila dyari* Busck, 1900:242.

**Diagnosis.**— This species may be distinguished from similar West Indian species by the straight and very white forewing fascia, and by the more orange apical mark. The genitalia show various small differences from closest allies.

**Description.**— Forewing length: 6.2mm ♂, 7.7mm ♀.

Male (Fig. 3a).— **Head:** brown with scales tan-tipped; labial palpus white, with each segment having a black distal band; antenna fuscous and white on alternating segments dorsally. **Thorax:** brown with scales tan-tipped; patagia same; venter white; legs white with black bands on tarsal segments. **Forewing:** basal half brown with tan-tipped scales; midwing white fascia (slightly angled), merging to apical half of mostly white and white-tipped brown scales, then darkening with tan-tipped scales toward termen; apex with triangular orange-yellow mark, thinning along termen; fringe black and silvery; venter fuscous with tan-brown on radial and cubital fields. **Hindwing:** fuscous with tan-brown streaks along radial and cubital veins; venter same; fringe fuscous and silvery. **Abdomen:** like thorax; venter dark fuscous, with white bands each segment. **Male genitalia** (Fig. 5): generic characters, with broad socius, valva with reduced setae at base; anellus narrow, then divergent dorsally as spatulate ends; aedeagus (Fig. 5a) with reduced cornutus.

Female (Fig. 3b).— Same as for male. **Female genitalia** (Fig. 7): generic characters, with sterigma plates oval and prominent; antrum without noticeable sclerotization anterior to simple ostium; corpus bursae ovate, with tear-drop shaped signum, and with a similar area of small spicules on the opposite side of bursa.

**Types.**— Holotype ♂: FLORIDA.— Palm Beach, Palm Beach Co., Mar [1899?], H. G. Dyar, ex *Ficus* (USNM 5362) [holotype lacking abdomen; wing slide USNM 77505].

**Specimen data.**— FLORIDA.— **Dade Co.:** *Deering Estate*, Miami, 25 Apr 1989 (1♂, 1♀), L. C. Dow (LCD).

**Lee Co.:** *Captiva Id. Refuge*, Sanibel Id., 7 Jan 1988 (1♂), J. B. Heppner (FSCA).

BAHAMAS.— *New Providence Id.:* Nassau, 5 Jul 1898 (1♂), Bonhote (BMNH).

**Distribution.**— Southern Florida, Palm Beach and Lee Counties south to Miami, Dade Co. The species is also recorded from the northern Bahamas (Nassau).

**Flight Periods.**— January, March and April, in Florida; July in the Bahamas.

**Hosts.**— *Ficus* sp. (Moraceae): reared by H. G. Dyar (Busck, 1900), but the species of the host was not specified. Busck also



Fig. 3. *Hemerophila dyari* Busck: a) ♂, Captiva Id., Lee Co., FL, 7 Jan 1988, J. B. Heppner (FSCA); b) ♀, Deering Estate, Miami, Dade Co., FL, 25 Apr 1989, L. C. Dow (LCD).

gives a detailed description of the larva from the rearing notes of H. G. Dyar.

**Remarks.**— Last collected as the holotype about 1899, this appears to be a rare Florida species, since the disjunct specimen from the Gulf Coast of Lee County would indicate that the recent collections do not represent a re-introduction from the Bahamas. *Hemerophila dyari* is very similar to several West Indian species, all having almost identical wing maculation. Genitalia show slight differences, and likewise the wing maculations have small differences which appear to be consistent for the different species. Overall size is also a factor, with *H. dyari* being among the smaller of the species. This will be discussed further in a revision of the entire genus. The *H. dyari* group of species has the thinner form of the antennae.

### ACKNOWLEDGMENTS

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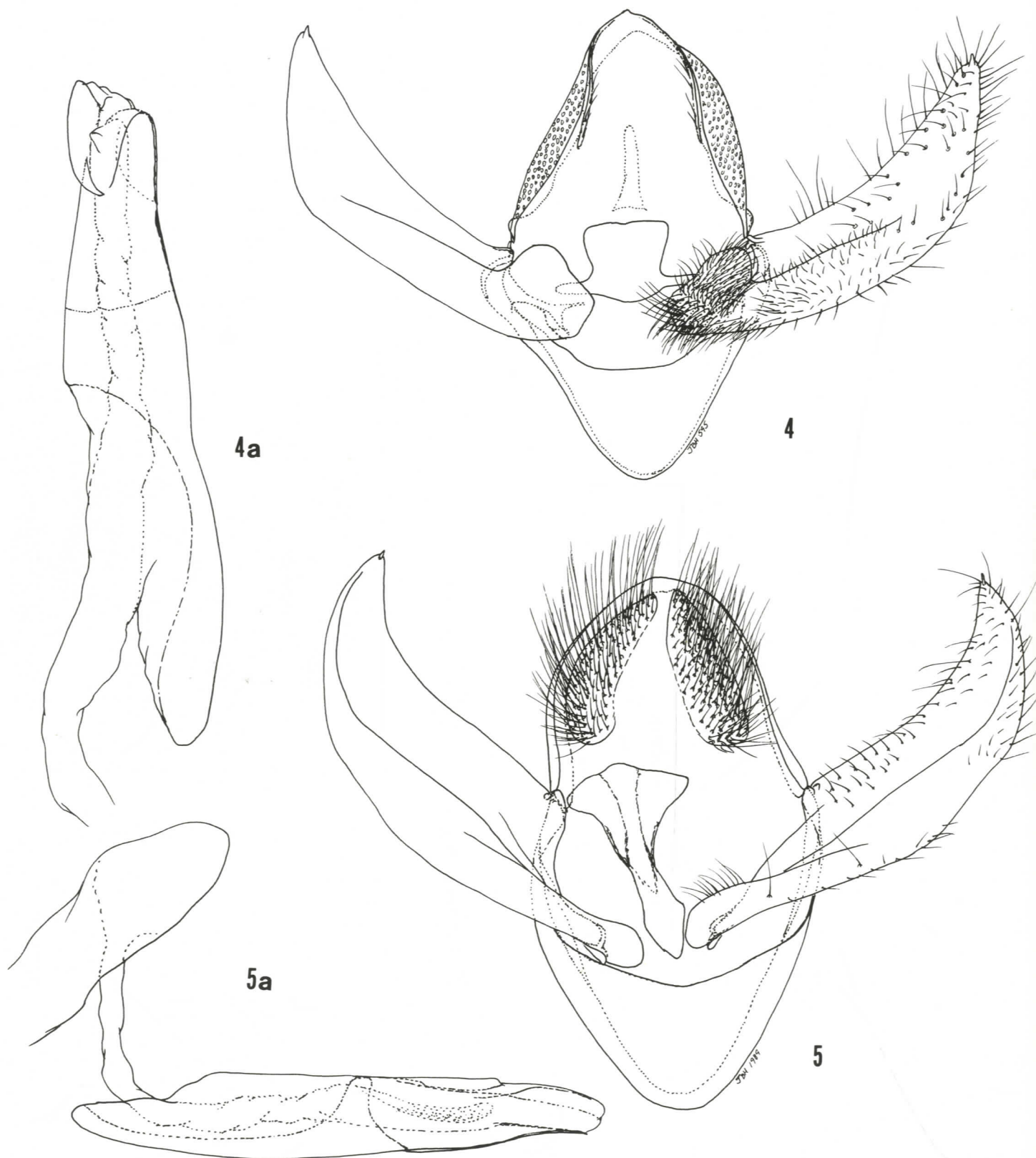


Fig. 4-5. Male Genitalia.— 4. *Hemerophila diva* (Riley), Long Pine Key, Everglades Natl. Park, Dade Co., FL, 26 Apr 1975, J. B. Heppner (FSCA/JBH 595); 4a) aedeagus. 5. *Hemerophila dyari* Busck, Deering Estate, Miami, Dade Co., FL, 25 Apr 1989, L. C. Dow (LCD/JBH 1989); 5a) aedeagus.

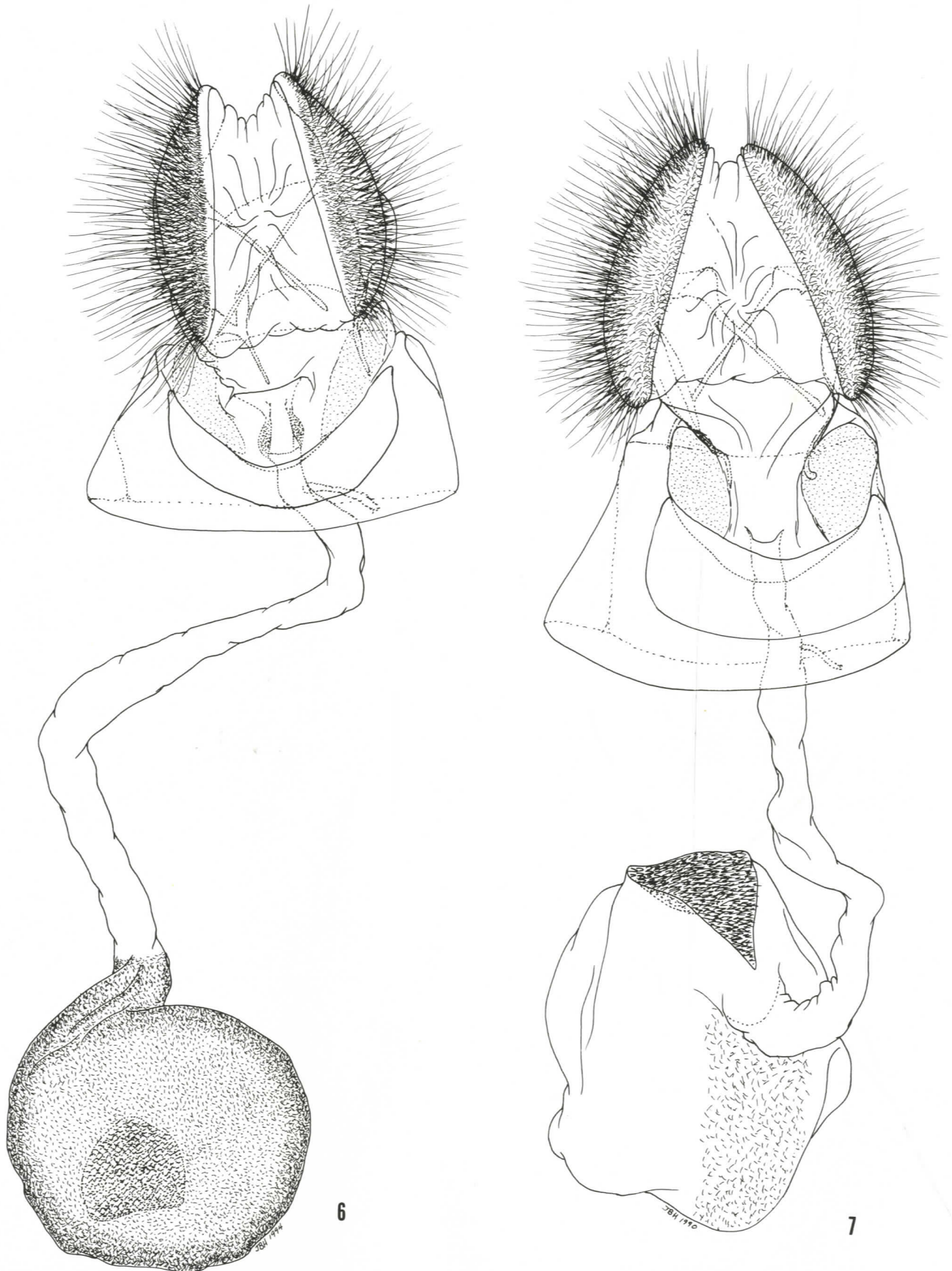


Fig. 6-7. Female Genitalia.— 6. *Hemerophila diva* (Riley), Key Biscayne, Dade Co., FL, 11 Apr 1989, W. Birch & D. Storch (FSCA/JBH 1994). 7. *Hemerophila dyari* Busck, Deering Estate, Miami, Dade Co., FL, 25 Apr 1989, L. C. Dow (LCD/JBH1990).

tory), London, England (BMNH); Museum of Comparative Zoology, Harvard University, Cambridge, MA (MCZ); and the National Museum of Natural History, Smithsonian Institution, Washington, DC (USNM). Specimens in my own collection are now combined with those of the Florida State Collection of Arthropods, Gainesville, FL (FSCA). Some specimens from the C. P. Kimball collection are now housed at the MCZ. Thanks are also due L. C. Dow, Largo, FL (LCD), for allowing study of his specimens.

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